

What is claimed:

1. A synthetic apolipoprotein-E mimicking polypeptide comprising an amino acid sequence selected from the group of

5 (i) X-Y-Arg-Arg-Y-Y-X-X-Y-Y-Arg-Y-Y-Arg-X-Y-Y-X or the reverse sequence thereof,

(ii) Arg-Arg-Y-Y-X-X-Y-Y-Arg-Y-Y-Arg-X-Y or the reverse sequence thereof,

(iii) Y-Y-X-X-Y-Y-Arg-Y-Y-Arg-X-Y-Y-X or the reverse sequence thereof, and

10 (iv) X-Y-Arg-Arg-Y-Y-X-X-Y-Y-Arg-Y-Y-Arg or the reverse sequence thereof,

wherein X is glycine, threonine, serine or alanine,

wherein Y is a hydrophobic amino acid,

15 wherein the polypeptide comprises an acetyl group at the N-terminus and an amide group at the C-terminus, and

wherein the polypeptide consists of a single domain.

2. The polypeptide of claim 1, wherein Y is selected from the group consisting of phenylalanine, tyrosine, leucine, isoleucine, valine, and tryptophan.

20 3. The polypeptide of claim 1, wherein the polypeptide comprises from about 10 amino acids to about 30 amino acids in length.

4. The polypeptide of claim 1, wherein the polypeptide comprises a sequence of consecutive amino acids selected from the group of SEQ ID NOS:1-207.

5. The polypeptide of claim 1, wherein the polypeptide comprises the sequence Gly-Ile-Arg-Arg-Phe-Leu-Gly-Ser-Ile-Trp-Arg-Phe-Ile-Arg-Ala-Phe-Tyr-Gly (SEQ ID NO:5).

6. The polypeptide of claim 1, which is a recombinant polypeptide.

5 7. The polypeptide of claim 1, which is a synthetic polypeptide.

8. The polypeptide of claim 1, which is a peptidomimetic.

9. An isolated nucleic acid encoding the polypeptide of any one of claims 1 to 8.

10 10. The nucleic acid of claim 9, wherein the nucleic acid comprises DNA, RNA and/or cDNA.

11. A vector comprising the nucleic acid of claim 9.

12. A host cell comprising the nucleic acid of claim 9.

13. The host cell of claim 12, which is eukaryotic or prokaryotic.

15 14. The polypeptide of claim 1, wherein the polypeptide enhances binding of low-density lipoprotein (LDL) or very low density lipoprotein (VLDL) to a cell.

15. The polypeptide of claim 1, wherein the polypeptide enhances degradation of low-density lipoprotein (LDL) or very low density lipoprotein (VLDL) by a cell.

20 16. A composition comprising the polypeptide of any one of claims 1 to 8 and a pharmaceutically acceptable carrier.

17. The composition of claim 16, wherein the carrier comprises dimyristoylphosphatidyl (DMPC), phosphate buffered saline or a multivesicular liposome.

18. A monoclonal antibody that specifically binds to the polypeptide of any one of claims 1 to 8.

19. A method for enhancing LDL binding to a cell, the method comprising contacting the cell with the polypeptide of any of claims 1 to 8.

5 20. A method for enhancing LDL and VLDL binding to a cell in a subject, the method comprising administering the polypeptides of any of claims 1 to 8, or a composition thereof, to the subject in an amount effective to increase LDL and VLDL binding to the cell of the subject.

10 21. A method for reducing serum cholesterol in a subject, the method comprising the step of administering to the subject an amount of the polypeptides of any of claims 1 to 8, or a composition thereof, effective to increase binding of LDL and/or VLDL to cells in the subject, thereby reducing serum cholesterol in the subject.

15 22. A method for treating a subject with coronary artery disease, the method comprising the step of administering to the subject an amount of the polypeptides of any of claims 1 to 8, or a composition thereof, to thereby treat the subject.

20 23. A method for treating a subject with dysbetalipoproteinemia, the method comprising the step of administering to the subject an amount of the polypeptide of any of claims 1 to 8, or a composition thereof, to thereby treat the subject.

25 24. A method for reducing the risk of myocardial infarction in a subject, the method comprising the step of administering to the subject an amount of the polypeptide of any of claims 1 to 8, or a composition thereof, to thereby treat the subject.

25. A method for treating atherosclerosis in a subject, the method comprising the step of administering to the subject the polypeptide of any of claims 1 to 8, or a composition thereof.

26. A recombinant cell comprising the nucleic acid of claim 9.

5 27. A recombinant cell producing the polypeptide of any one of claims 1 to 8.

28. A transgenic, non-human subject comprising the nucleic acid of claim 9.

10 29. The transgenic subject of claim 28, wherein the subject is an animal or a plant.

30. A transgenic non-human subject expressing the polypeptide of any of claims 1 to 8.

15 31. The method of any of claims 19 to 25, wherein the administration is oral, parenteral, by intramuscular injection, by intraperitoneal injection, transdermal, extracorporeal, topical, intranasal or by inhalant.

32. The method of any of claims 19 to 25, wherein the subject is a human subject.

33. The method of any of claims 19 to 25, wherein the subject is mammal is a mouse, a rat, a rabbit, a cow, a sheep, a pig, or a primate.

20 34. The method of claim 33, wherein the primate is a human, a monkey, an ape, a chimpanzee, or an orangutan.